

# **Environmental Effects on Truck Driver ISO 2631 Acceleration Exposure**

Jack Wasserman, Logan Mullinix, Kelly Neal, Shekhar Khanal, Don Wasserman

## **Introduction**

This paper presents current finding on truck driver average exposure to acceleration for several different manufacturer's cab-over trucks on a variety of roads in different countries. The predominant time, for this aspect of the study has been spent in the area around London, England and Warsaw, Poland.

The ECE directive 2002/44/EC has provided specific guidelines for vehicle operators 8 hour average acceleration exposure. The primary considerations have been on truck design including the air-ride driver's seat. The truck manufacturers have produced truck cabs that have some separate suspension from the truck frame. The truck seat manufacturers have been producing air-ride suspension seats for the cab. Both of these designs have had the objective of meeting the ECE directive and providing the vehicle drivers with some degrees of comfort.

This paper will provide some information on the ability of the vehicles to operate on a variety of roads and meet the objectives.

## **Method**

The primary method for evaluation of the driver's exposure has been the use of a seat pad attached to the driver's seat. Although this sensor system provides the critical information for the driver, an understanding of the reasons for the values requires additional measurements.

The initial study in England used both driver and passenger seat pads, as shown in Figure 1, as well as triaxial accelerometers mounted on the base of the seat. The latest studies used significantly more transducers to better understand the relative rotations and translations on the truck frame, the cab, and the driver.



Figure 1 Triaxial Acceleration Seat Pad

The data was processed to produce the average accelerations for the X - axis, Y - axis, and Z – axis based on data for 360 seconds or longer. The time length is required by the ISO 2631 standard for reasonable accuracy.

## Results

The data has shown road situations that have exceeded the  $0.5 \text{ m/s}^2$  but not to exceed the  $1.15 \text{ m/s}^2$  for extended periods of time. Comparisons between loaded and unloaded trucks and between different drivers have been done for certain situations. The major aspects related more to the road quality than the particular manufacturer for a vehicle or a seat. As can be seen in Figure 2, the driver's seat generally has lower values than the passenger's seat.

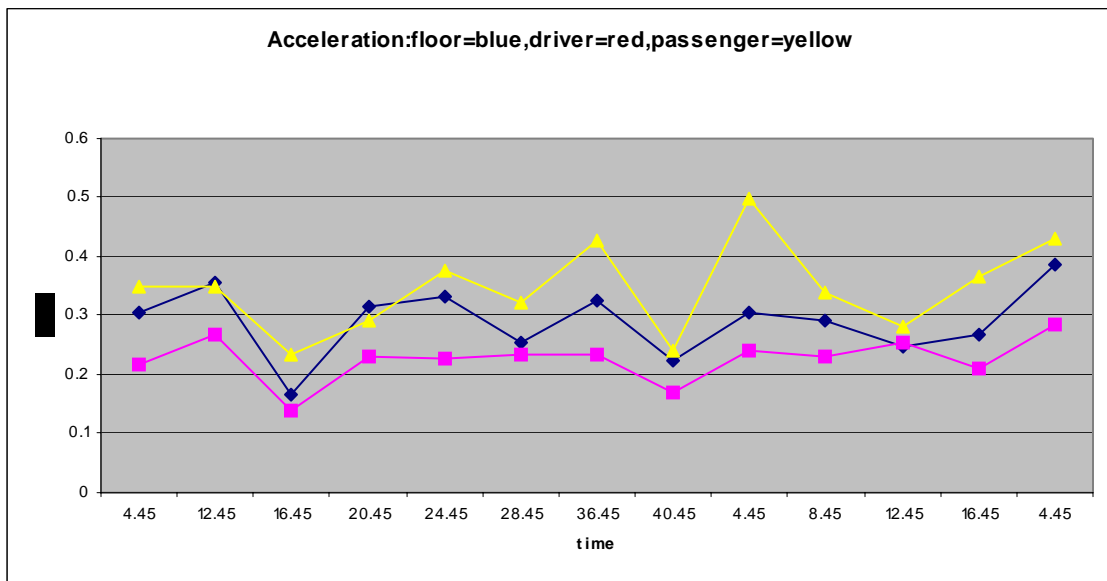


Figure 2 Comparison of Seating during time.

## Conclusions

The initial results have shown that the dominant effects of the levels of acceleration expose have related to the quality of the roads and the truck speed. Continued testing is planned for the future to further understand the potential risks to the drivers and to allow a better process for assessment and design of truck seats.